

CLAIMS

What is claimed is:

1. A system for removing from a molding tool a runner assembly comprising a plurality of molded parts that are connected to a runner via gates and subsequently degating the plurality of molded parts from the runner, said system comprising:
a source of ultrasonic energy; and
a robot arm assembly configured to remove the runner assembly from the molding tool and to position the runner assembly proximate to the source of ultrasonic energy.
2. The system of claim 1, said source of ultrasonic energy comprising an ultrasonic horn.
3. The system of claim 1, said robot arm assembly comprising a robot arm.
4. The system of claim 3, wherein said robot arm assembly comprises a carrier assembly movably connected to said robot arm and configured to hold and carry the runner assembly.
5. The system of claim 4, wherein said carrier assembly comprises at least one piston assembly configured to press the runner against said source of ultrasonic energy.
6. The system of claim 5, wherein said at least one piston assembly comprises a piston having a groove configured to permit at least a portion of the runner to be positioned therein.
7. The system of claim 4, wherein said carrier assembly comprises at least one end effector configured to hold at least a portion of said runner assembly.
8. The system of claim 7, wherein said at least one end effector comprises a suction device.
9. The system of claim 4, wherein said carrier assembly comprises a gripper configured to grip a portion of the runner assembly.
10. The system of claim 1, further comprising a base to which said source of ultrasonic energy is invertedly mounted.

11. The system of claim 10, wherein said base comprises at least one opening configured so that, when the plurality of molded parts is degated from the runner, at least one of the plurality of molded parts is permitted to drop through said at least one opening for collection.

12. The system of claim 11, further comprising at least one collection tube, wherein said at least one collection tube is mounted to said base proximate to said at least one opening to direct said molded parts from said at least one opening to a collection unit.

13. The system of claim 12, said collection unit comprising at least one collection bucket.

14. The system of claim 12, said collection unit comprising a conveyor belt.

15. The system of claim 2, wherein said ultrasonic horn is configured to receive at least a portion of the runner assembly so that the transmission of ultrasonic energy along the runner to the gates is optimized.

16. A method for degating a plurality of molded parts that are connected to a runner via gates, said method comprising:

causing a robot arm assembly to position the plurality of molded parts and the runner proximate to a source of ultrasonic energy;

pressing the runner against said source of ultrasonic energy; and

activating said source of ultrasonic energy so that the plurality of molded parts is degated from the runner.

17. The method of claim 16, further comprising causing said robot arm assembly to discard the runner.

18. The method of claim 16, further comprising activating the robot arm assembly to remove the plurality of molded parts and the runner from a molding tool prior to said causing.

19. The method of claim 16, wherein said pressing comprises causing said robot arm assembly to press the runner against said source of ultrasonic energy.

20. The method of claim 16, further comprising permitting the plurality of molded parts to drop from the runner to a collector after the plurality of molded parts is degated from the runner.

21. The method of claim 16, wherein said robot arm assembly comprises a carrier assembly configured to hold and carry the plurality of molded parts and the runner.

22. The method of claim 16, wherein said source of ultrasonic energy is an ultrasonic horn.

23. The method of claim 21, wherein said carrier assembly comprises at least one piston assembly configured to press the runner against said source of ultrasonic energy.

24. The method of claim 23, wherein said at least one piston assembly comprises a piston having a groove configured to permit at least a portion of the runner to be positioned therein.

25. The method of claim 21, wherein said carrier assembly comprises at least one suction device.

26. The method of claim 21, wherein said carrier assembly comprises a gripper configured to grip a portion of the runner.

27. A robot arm assembly for holding a runner assembly comprising a plurality of molded parts and a runner connected thereto during degating of the plurality of molded parts from the runner, the robot arm assembly comprising:

a robot arm configured to transport the runner assembly from a molding tool to a source of ultrasonic energy; and

a carrier assembly configured to hold the runner assembly.

28. The robot arm assembly of claim 27, wherein said carrier assembly comprises: a face plate movably connected to said robot arm;

at least one holding device connected to said face plate and configured to hold said runner assembly; and

at least one piston assembly connected to said face plate and configured to press said runner assembly against said source of ultrasonic energy.

29. The robot arm assembly of claim 28, wherein said at least one holding device comprises a suction device.

30. The robot arm assembly of claim 27, wherein said carrier assembly further comprises a gripper configured to grip a portion of the runner assembly.

5 31. The robot arm assembly of claim 28, wherein said at least one piston assembly comprises a piston configured to press the runner against said source of ultrasonic energy.

32. The robot arm assembly of claim 31, wherein said piston comprises a groove configured to permit at least a portion of the runner to be positioned therein.

10 33. A method for removing from a molding tool a plurality of molded parts that are connected to a runner via gates and subsequently degating the plurality of molded parts from the runner in a single phase operation, said method comprising:

activating a robot arm assembly to remove the plurality of molded parts and the runner from the molding tool;

15 causing said robot arm assembly to position the plurality of molded parts and the runner proximate to a source of ultrasonic energy;

pressing the runner against said source of ultrasonic energy so that when said source of ultrasonic energy is activated, a standing wave of mechanical vibration is transferred along the runner to the gates;

20 activating said source of ultrasonic energy so that the plurality of molded parts is separated from the runner; and

causing said robot arm assembly to discard the runner.